PATENT CLAIMS

1. A high-power semiconductor module (10), in which a number of flat semiconductor chips (14) rest with their lower face flat on a base plate (11), establishing first electrical contacts, and have a cover plate (13), which is arranged parallel to the base plate (11), applied to their upper face with pressure, establishing second electrical contacts, characterized in that those faces, or outer faces, of the base plate (11) and of the cover plate (13) which face away from the semiconductor chips (14) are each electrically isolated from the semiconductor chips (14).

2. The high-power semiconductor module as claimed in claim 1, characterized in that a first electrically conductive, elastic connecting element, preferably in the form of a first contact spring (15), is arranged between the upper face of each semiconductor chip (14) and the cover plate (13).

3. The high-power semiconductor module as claimed in one of claims 1 or 2, characterized in that the base plate (11) comprises an electrically insulating substrate (17) which has a first metal coating (19) on the inner face, and in that the semiconductor chips (14) are mounted, preferably by techniques such as bonding, soldering or welding, preferably by soldering, on the first metal coating (19).

4. The high-power semiconductor module as claimed in claim 3, characterized in that the substrate (17) is composed of a ceramic, preferably an AlN ceramic.

5. The high-power semiconductor module as claimed in one of claims 3 or 4, characterized in that the base plate (11) is provided with a second metal coating (18) on the outer face.

6. The high-power semiconductor module as claimed in one of claims 3 to 5, characterized in that, in an area located outside the semiconductor chips (14), pressure is applied to the first metal coating (19) by the cover plate (13), thus establishing a third electrical contact.

7. The high-power semiconductor module as claimed in claim 6, characterized in that the third electrical contact is established via a second electrically conductive, elastic connecting element, preferably in the form of a second contact spring (16).

8. The high-power semiconductor module as claimed in one of claims 6 or 7, characterized in that the cover plate (13) comprises a first isolation plate (20), on whose inner face a first metallic contact plate (21) is arranged, via which the second electrical contacts with the semiconductor chips (14) are established, and in that a second metallic contact plate (23) is arranged on the first metallic contact plate (21), and electrically isolated from it, via which the third electrical contact with the first metal coating (19) on the base plate (11) is established.

9. The high-power semiconductor module as claimed in claim 8, characterized in that the first and the second metallic contact plates (21 and 23, respectively) are isolated from one another by a second isolation plate (22).

10. The high-power semiconductor module as claimed in one of claims 1 to 9, characterized in that an electrically insulating housing (12) is arranged between the base plate (11) and the cover plate (13), and encloses the semiconductor chips (14) and the associated contact devices (15, 16).

11. The high-power semiconductor module as claimed in one of claims 1 to 10, characterized in that the semiconductor chips (14) are connected electrically in parallel within the high-power semiconductor module (10).

12. The high-power semiconductor module as claimed in claim 11, characterized in that at least some of the semiconductor chips (14) are controllable semiconductor switches, in particular IGBTs.

13. Use of a high-power semiconductor module as claimed in one of claims 1 to 12 in a power-electronics system, in which the high-power semiconductor module (10) is arranged together with a cooling apparatus (24), which is adjacent to the outer face of the base plate (11), to form a stack, and pressure is applied to it in the stack.